# GSU Hodoscope

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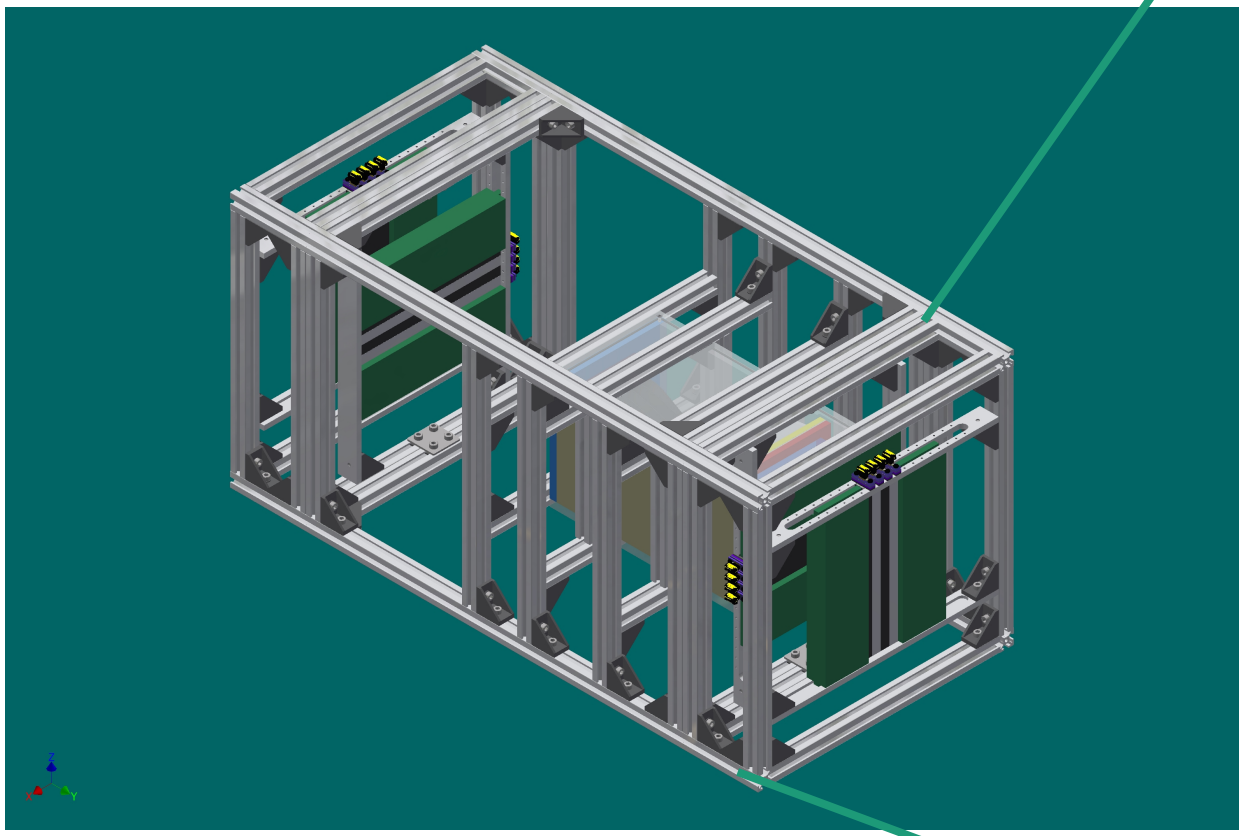
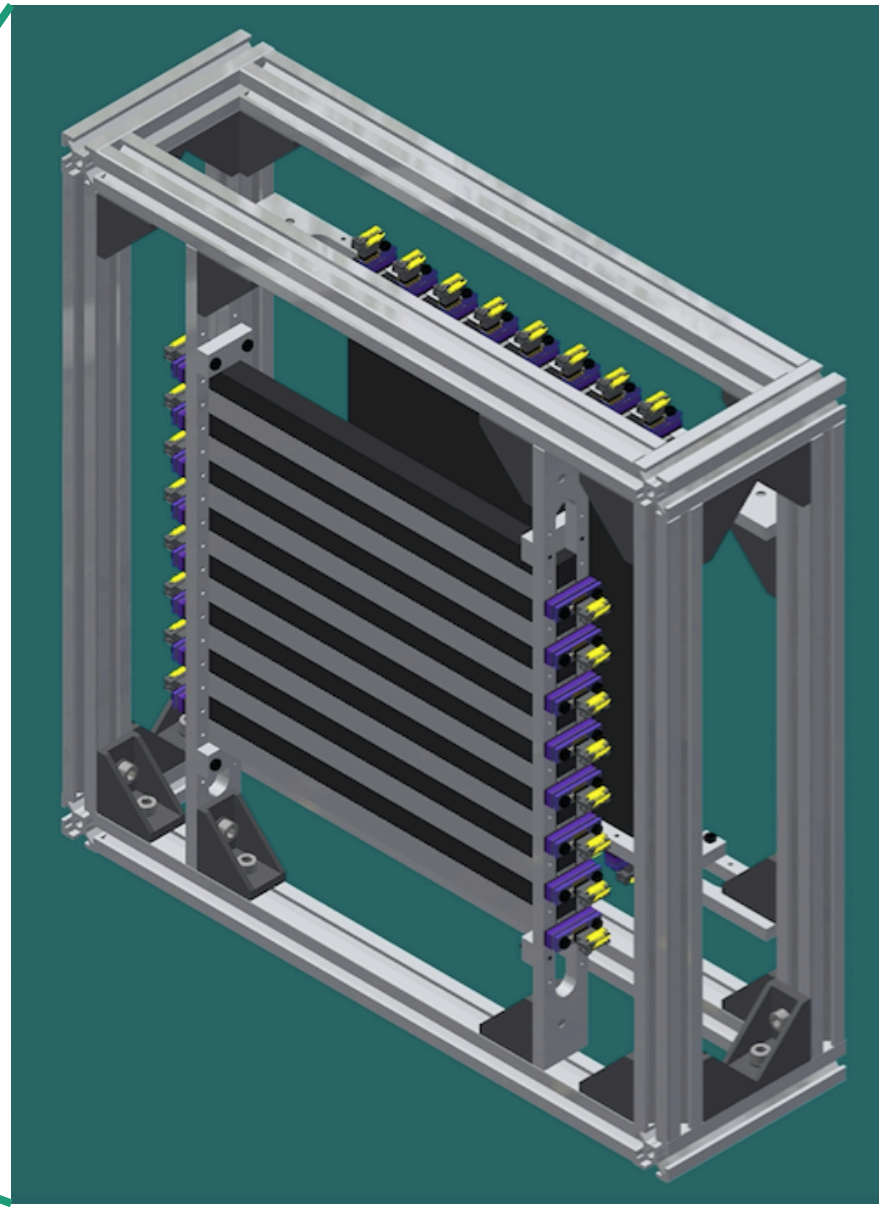
# Introduction

- This hodoscope was designed and built for testing a modular RICH prototype detector at Fermilab for the future EIC experiments for identifying charged hadron particles in the momentum range between 3 – 10 GeV/c.
- The hodoscope was built from scratch at GSU, which includes the following components:
  - Finger scintillators: 1cm x 1cm x 20cm, which were cut from 1cm x 20cm x 20cm scintillator sheets from ELJEN at GSU physics shop
  - Wavelength shifting fibers were glued inside a groove on the finger scintillator.
  - Readout PCB boards:  include a spacer, preamp and service boards which were designed and built by GSU students.
  - MPPCs (i.e., SiPM) bias voltages were set with GSU built power supplies (one per channel) from a Raspberry PI.
  - The fingers are mounted inside a frame built with extruded aluminum.

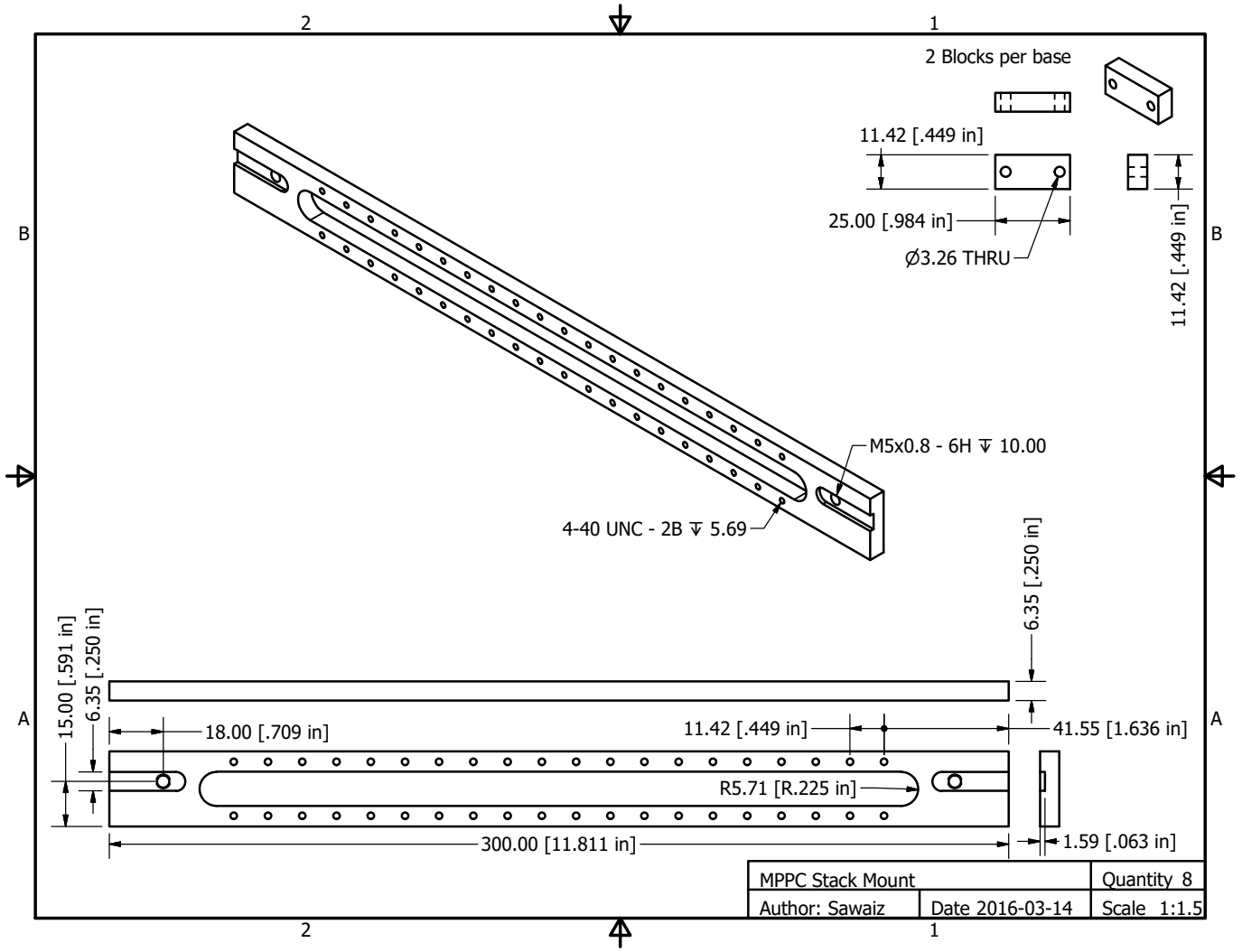
# How does it look like?

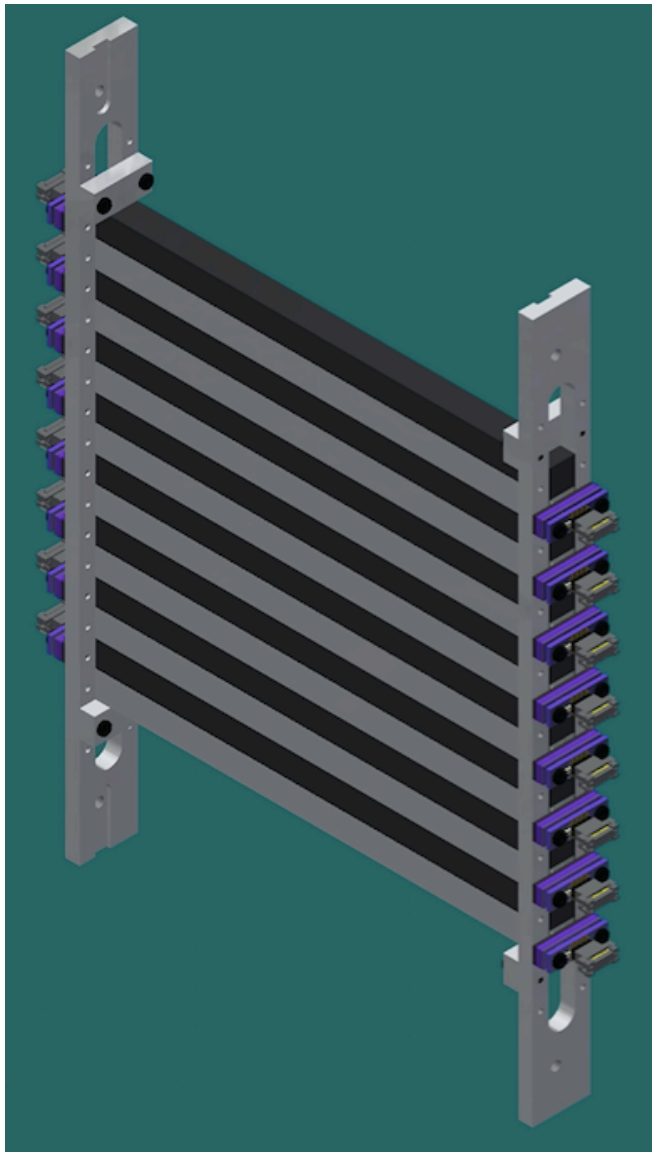




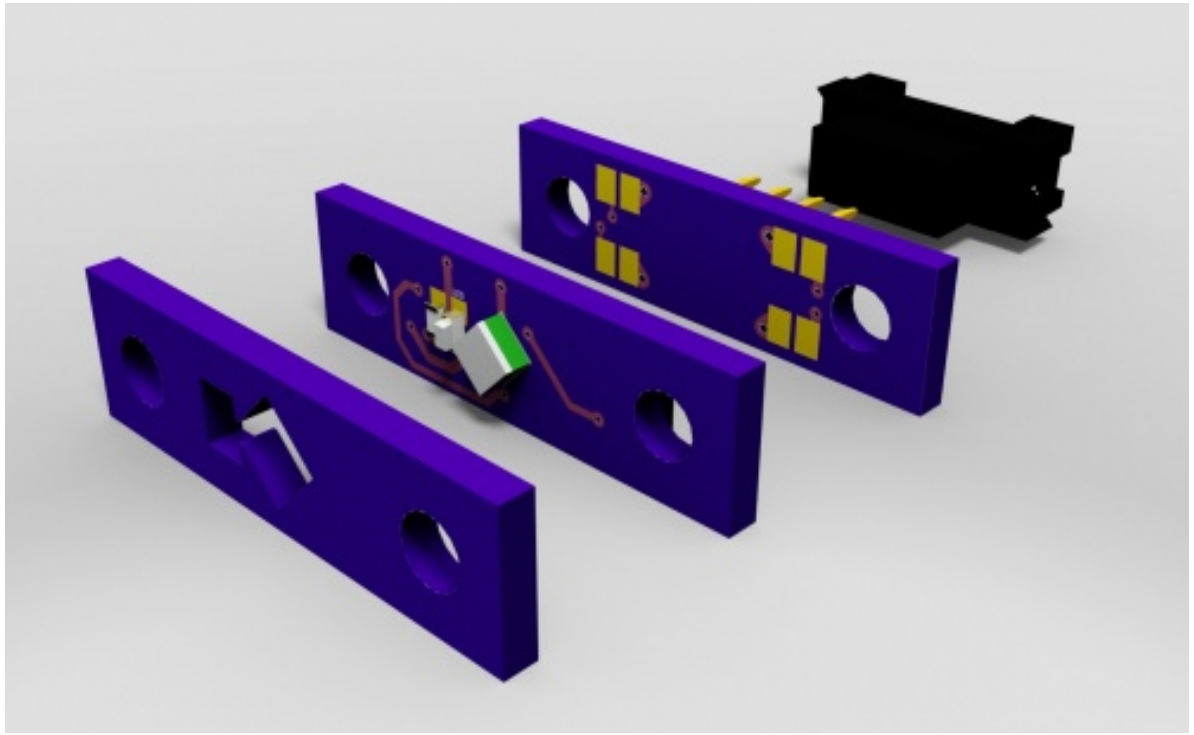
mRICH test setup

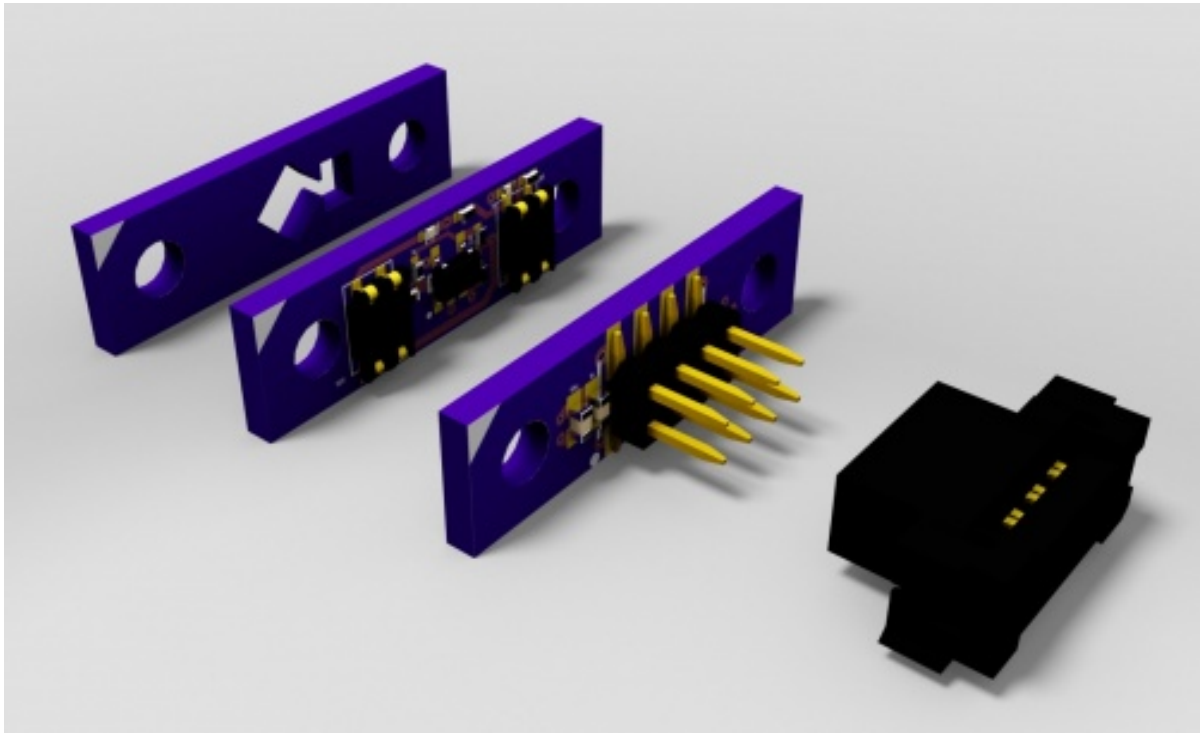
# Components


2 Blocks per base
11.42 [.449 in]
25.00 [.984 in]
Ø3.26 THRU
11.42 [.449 in]
M5x0.8 - 6H ↧ 10.00
4-40 UNC - 2B ↧ 5.69
6.35 [.250 in]
15.00 [.591 in]
6.35 [.250 in]
18.00 [.709 in]
11.42 [.449 in]
41.55 [1.636 in]
R5.71 [R.225 in]
1.59 [.063 in]
300.00 [11.811 in]
MPPC Stack Mount
Quantity 8
Author: Sawaiz
Date 2016-03-14
Scale 1:1.5

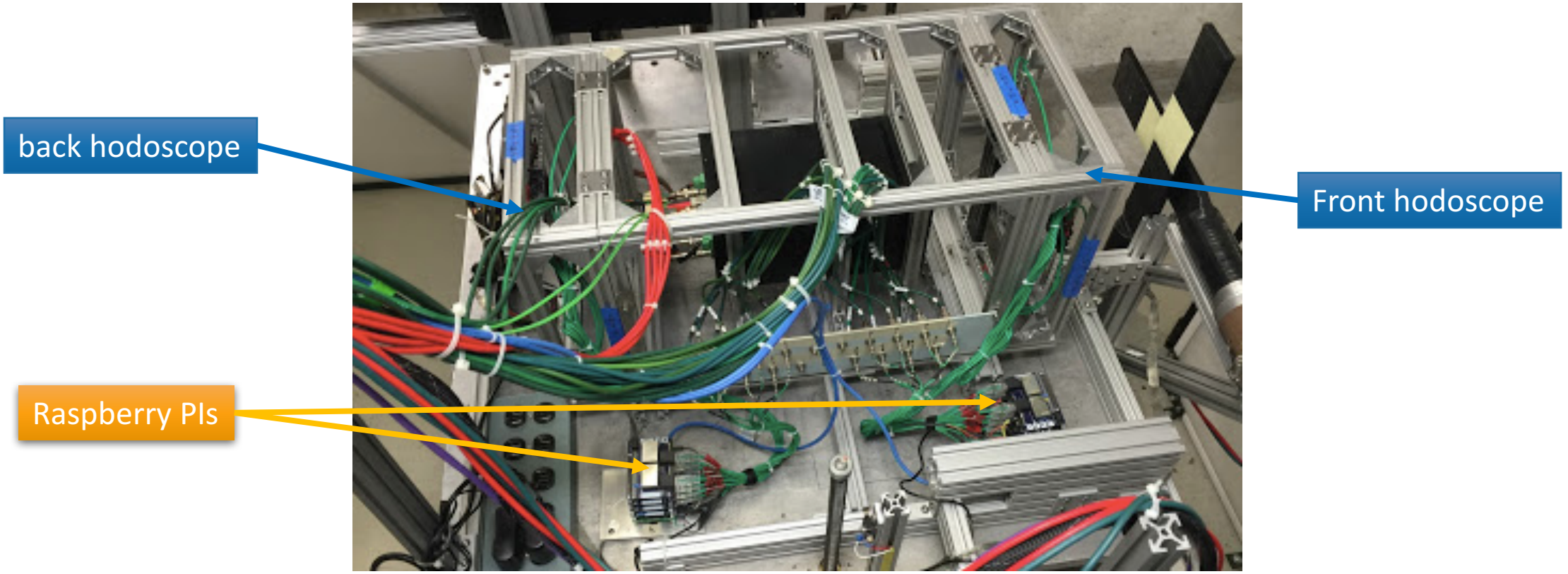


# Readout PCBs (3D renderings done by students)

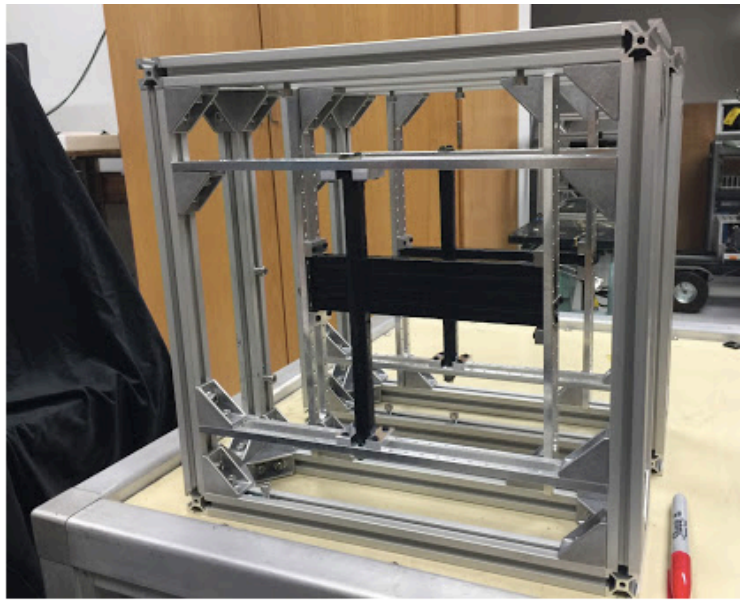




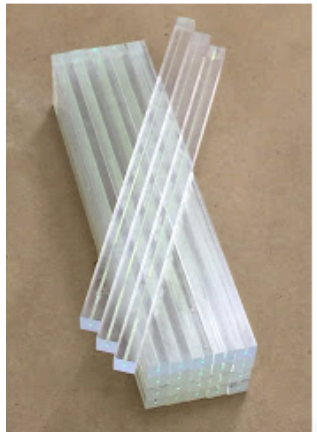
# mRICH setup at Fermilab

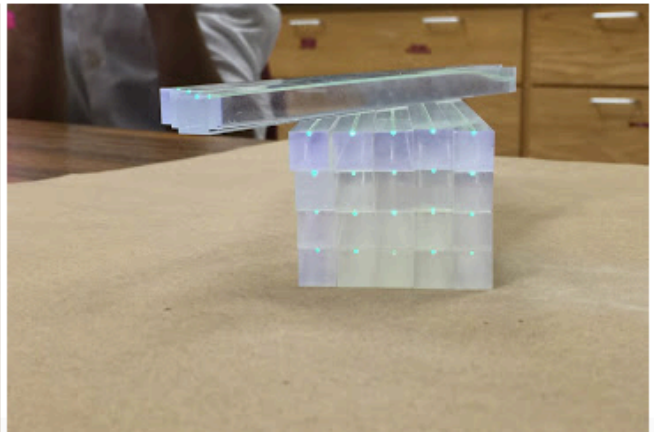


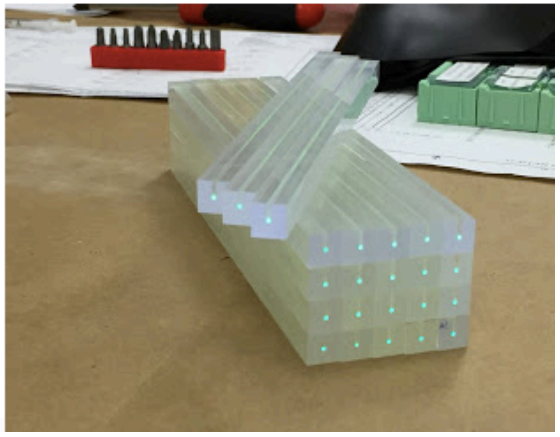
# A few pictures from building the hodoscope

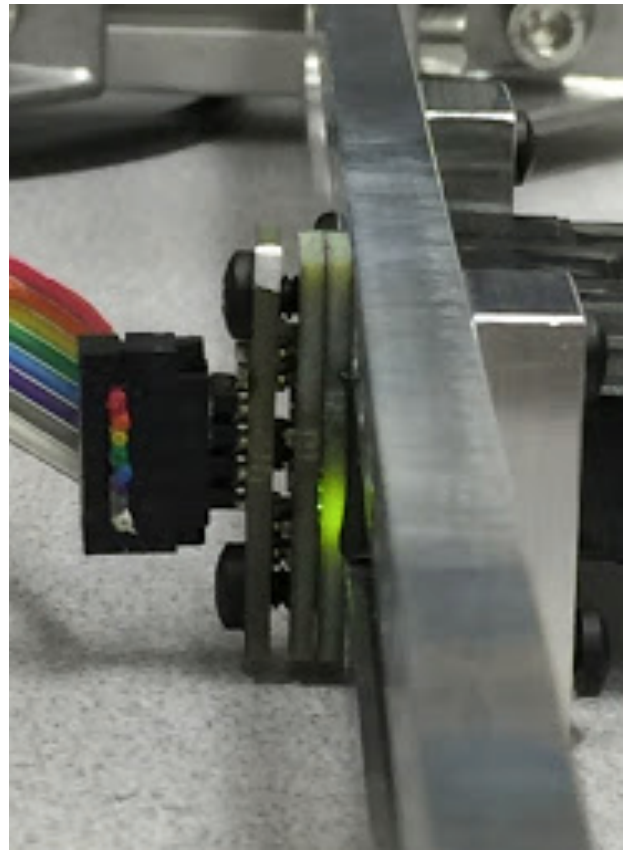


:5

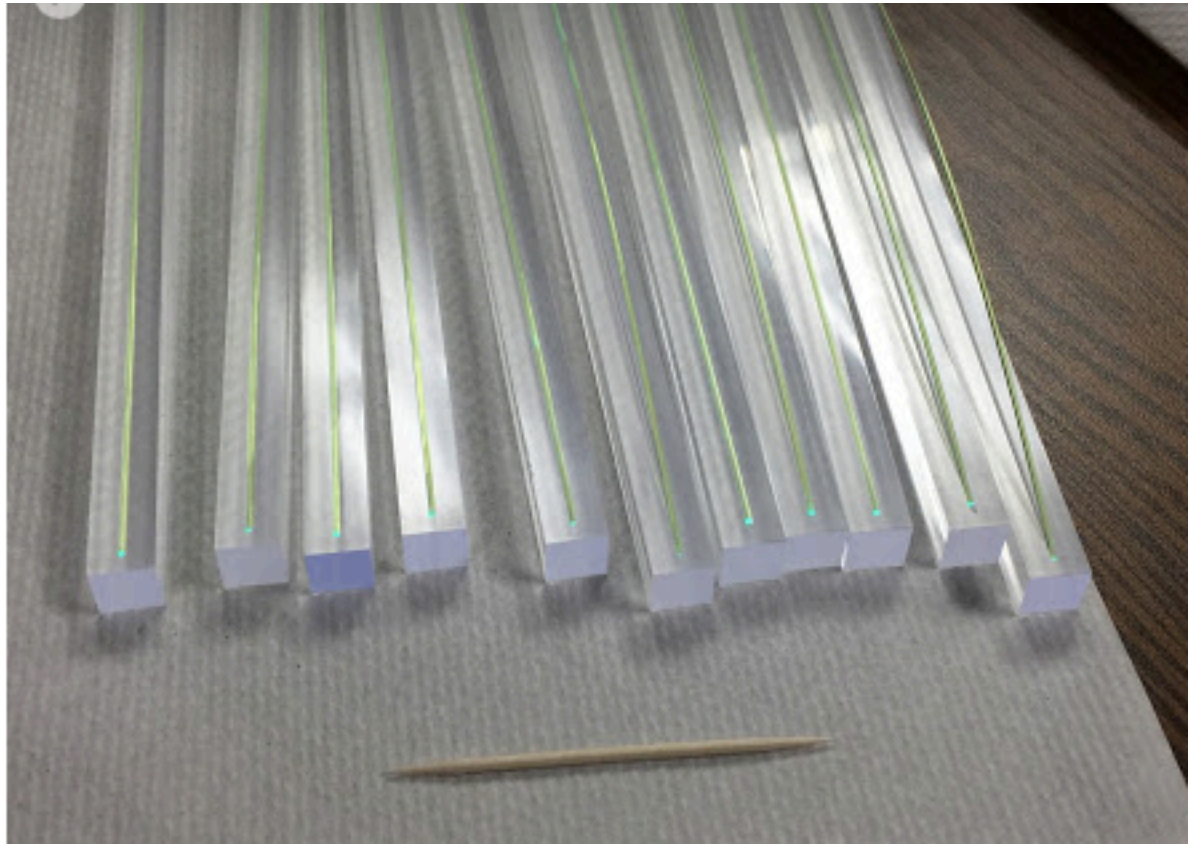








# Gluing fibers



# Assembling power supply


# Is it useful for the upcoming sPHENIX Hcal test?

- If it is deemed useful for the upcoming HCal beam test, we can design a patch panel to break out the amplified signals from each fingers and feed them to the sPHENIX test DAQ.
- There are two hodoscopes which can be made available.